

MASS. TC 60.2: M38

The
Massachusetts
Turnpike

Critical Needs for the 1990's

An Accelerated Capital Improvement Program

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CRITICAL NEEDS FOR
THE 1990'S
AN ACCELERATED CAPITAL
IMPROVEMENT PROGRAM

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Contents

<i>The Massachusetts Turnpike in the 1990's and Beyond</i>	<i>1</i>
<i>Public Safety—A Compelling Need</i>	<i>3</i>
<i>The Economic Lifeline of Massachusetts</i>	<i>7</i>
<i>A Safe Highway and a Good Neighbor</i>	<i>15</i>
<i>The Time to Act</i>	<i>19</i>

The Massachusetts Turnpike in the 1990's and Beyond

As we enter the next century, much of the Massachusetts Turnpike will turn 50 years old. Bridges and roadways built to high standards in the mid 1950's will require substantial reconstruction as they near a half century. An aging turnpike carrying an increasing volume of traffic, combined with the dramatically escalating costs of highway construction and maintenance, present an unprecedented challenge. The Massachusetts Turnpike—which must continue to function as a safe highway and as an essential economic component of the Commonwealth's transportation system—must meet that challenge.

Last year, the turnpike carried 152 million cars, trucks and buses—nearly a quarter billion persons—to destinations across the Commonwealth. Since 1979, traffic has increased by nearly 50 million cars, trucks and buses—an increase of 52% in ten years. Much of this increase represents commuter traffic to growing regional economic centers such as Worcester, the Blackstone Valley, greater Springfield and the Berkshires. The growth of these regional centers means that more drivers use the turnpike daily to reach work locations.

As the major trucking route for Massachusetts, this vital economic lifeline carries many of the goods shipped throughout the Commonwealth. Truck traffic has grown substantially since 1979 and trucks loaded with cargo routinely weigh more than they did ten years ago. In fact, since 1979, truck traffic on the turnpike has increased by more than two million trips per year. This increase is especially significant given that, at 80,000 pounds, one fully loaded tandem trailer truck can produce as much highway wear as 9,600 autos.

Combined with the inevitable aging of the roadway and its bridges, this growing volume of traffic and its increased wear on the turnpike have caused a rapid rise in the deterioration of highway facilities.

In addition, construction costs for work along the turnpike have escalated substantially over the past ten years. In 1980, it cost \$180,000 to resurface one mile of the Massachusetts Turnpike; by 1989, it cost \$550,000 to resurface that same mile of the turnpike. According to the Construction Cost Index (published by *Engineering News Record*, a major construction industry journal), construction costs in the Boston area have risen by more than 85% since 1978.

The Massachusetts Turnpike has always been maintained at a high standard in recognition of its central role in the state's trans-

portation network and to the state's economy. In view of the advancing age of its facilities and increased utilization, an accelerated program of capital investment is both prudent and necessary.

The Authority Looks to the Future

In order to be prepared to meet the important capital investments of the 1990's, the Turnpike Authority has undertaken a major *Critical Needs Study* to assess the future construction needs of the turnpike and to reflect upon the management strategies that will be needed to accommodate increased traffic. With its consulting engineers, the Authority examined the requirements of public safety and economic efficiency. The study evaluated the condition of roadways, bridges, toll plazas and more. It recommends a program of critical repair work and essential improvements as well as traffic management initiatives that will help the turnpike maintain this essential economic lifeline of goods and services throughout the state.

The *Critical Needs Study* shows clearly that the Authority must undertake essential repair work to maintain a safe highway and must seek a minimum level of highway improvements if it is to continue to accommodate the needs of increased traffic and economic growth. As the Authority looks to the future, unquestionably the challenges of the 1990's and beyond will demand expanded resources. The Turnpike Authority's 1989 capital investment of approximately \$25 million will need to be more than doubled over the next decade in order to succeed in maintaining a safe roadway.

The following report details those construction projects which are essential to maintain the safety of the Massachusetts Turnpike and those projects which will allow the turnpike to handle increased traffic efficiently and to accommodate future economic growth.

Public Safety— A Compelling Need

Priority Projects for the Massachusetts Turnpike

The *Critical Needs Study* has identified major projects that are essential to the safe and efficient operation of the turnpike. It also underscored the need to significantly expand the Authority's successful maintenance and construction programs to keep pace with the rapidly aging roadway system. Therefore, it is imperative to start work on these projects soon. Delay may jeopardize public safety and delay also will be costly to turnpike patrons. Once a turnpike road surface has deteriorated to poor condition, it can add up to 20% more to the cost of restoring that road surface than if repairs were undertaken while it was still in fair condition. The following major components of the turnpike system should be repaired or replaced within the next ten years to maintain high standards of public safety and highway efficiency.

Bridge deck reconstruction—cost per average bridge:
\$525,000 in 1980;
\$1,650,000 in 1989.
Increase of 214%.



Bridges

The Massachusetts Turnpike Authority owns and maintains 260 bridges from Boston to the Berkshires. Problems of age, increased traffic and heavier truck weights in combination with the effects of New England's weather have resulted in deteriorated deck concrete and reinforcing steel on bridges along the turnpike. During the past 15 years, a third (59) of the bridge decks of the initial turnpike have been replaced and a quarter (18) of the decks on the Boston extension have been repaired under the Authority's ongoing bridge reconstruction program. This means that two-thirds of the turnpike's bridges which will reach 40 years of age within the next decade remain to be reconstructed requiring an accelerated capital investment program.

Bridge deck replacement entails the complete removal of existing reinforced concrete including curbs, sidewalks and other elements and construction of a new reinforced concrete deck. Necessary repairs to the substructure or bridge joints are undertaken during construction as well as alterations to drainage and reconstruction of bridge approaches. To increase safety, new concrete barriers and highway guard are added when bridge decks are reconstructed.

Bridge deck repair involves removal and replacement of only the top four inches of concrete and the top layer of reinforcing steel. Repair of any necessary structural elements as well as sidewalks

and railings are undertaken and bridge approaches are resurfaced during construction.

A bridge inspection by the Authority's consulting engineers in the spring of 1989 assessed the condition of each of the 260 bridges along the length of the turnpike. The inspection resulted in a prioritized list of 183 bridges that remain to be repaired or reconstructed under the Authority's Replacement Reserve program. These bridge projects must be undertaken to maintain the high standards of public safety to which patrons of the turnpike are entitled and accustomed.

Roadways

The Massachusetts Turnpike Authority owns and maintains 135 miles of roadway, which represent 1,100 lane miles, in addition to many miles of approach ramps and numerous acres of paved toll plazas. Increased traffic, heavier trucks, weather and general age have all contributed to the deterioration of roadway surfaces. The maximum attainable life-span of good quality bituminous concrete overlay in New England has been established as between twelve and fifteen years. Turnpike maintenance staff are now repairing pavement that has been in service for nineteen years—a testimony to the excellence of turnpike maintenance. During the past five years, the Authority has resurfaced more than 35 miles of turnpike surfaces including eastbound and westbound roadways (four to six lanes) and shoulders.

Resurfaced roadways provide an improved and safer riding surface. A rough surface can result in driver fatigue that can lead to accidents and vehicle wear that causes higher fuel costs and repair bills. Poor pavement maintenance can cause rutting along wheel tracks and ruts can fill with water and ice during storms causing vehicles to skid and drivers to lose control. Smooth roadways provide better surface friction for stopping and good drainage to protect the roadway subsurface and produce a better surface for snow plowing. To maintain the turnpike's safety and efficiency, ten miles of highway surface should be replaced annually, that is nearly 60% faster than the current rate of resurfacing.

Bridge deck repair— cost per average bridge:

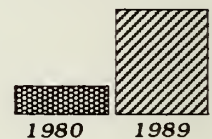
\$165,000

in 1980;

\$570,000

in 1989.

Increase of
245%.



Pavement resurfacing cost per mile:

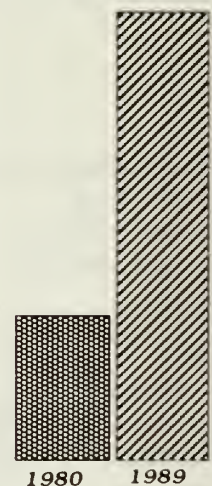
\$180,000

in 1980;

\$550,000

in 1989.

Increase of
205%.



**Highway guard
replacement
cost per mile:
\$120,000
in 1984;
\$330,000
in 1989.
Increase of
175%.**



Highway Guard Systems

Highway guard systems, including cable guard, steel beam and concrete barrier, play a critical role in reducing the severity of accidents. When a vehicle leaves the highway, highway guard can shield a motorist from hazards along the roadway such as rock faces, steep slopes or fixed objects like sign supports. Flexible highway guard systems, such as the steel beam system used along the turnpike, have proved their effectiveness at saving lives and reducing injuries.

While never compromising on safety standards, the Turnpike Authority is committed to a highway guard system that is compatible with the surrounding environment.

Much of the highway guard along the turnpike should be replaced because it is more than 30 years old and in poor condition. Of the 280 total miles (eastbound and westbound plus approaches), 210 miles of turnpike highway guard has been repaired or replaced under routine maintenance programs or as part of resurfacing contracts. Seventy miles of highway guard remains to be replaced, most of which is more than 30 years old and is located along western stretches of the highway.

Additional Safety Improvements

In addition to bridges, road surfaces and highway guard, several additional items would considerably increase the safety and efficiency of the turnpike.

As part of a comprehensive traffic management program, which includes new initiatives such as tandem toll booths, toll plazas should be upgraded and improved to increase highway capacity and reduce traffic congestion. Decreased traffic congestion at toll plazas improves highway safety by minimizing unexpected vehicle queues and can also help to lessen air pollution at toll plazas.

As the turnpike carries an increasing volume of traffic, service areas should be upgraded to accommodate the needs of the travelling public as well as the greater need for auto and truck parking. Service areas play an important role in combating driver fatigue and offer drivers shelter and rest during bad weather. Improvements should include resurfaced approaches, upgraded service area buildings and additional landscaping.

Maintenance areas also are in need of major rehabilitation. Certain buildings and paved areas are outmoded and do not meet current needs for equipment storage, repair workshops and office space as well as sanitary facilities. For example, snow plowing equipment currently is stored outside since modern plows are too wide to enter the storage areas. This equipment has a longer life if stored inside. Greater efficiency of maintenance operations and a higher level of work place safety could be attained with a program of rehabilitation. Many maintenance buildings are nearly 30 years old and in serious need of new roofs, doors and windows and mechanical systems such as boilers.

As turnpike traffic increases, traffic management systems will allow the Authority to maximize existing highway potential without roadway expansion. One system, variable message signs, has been shown to increase highway safety by alerting motorists of upcoming accidents, traffic congestion or construction activities. Located a mile or two before key interchanges, they can advise the motorist to use alternate routes if necessary.

Fencing of the turnpike right-of-way, especially in residential areas, should be repaired or replaced where it is damaged by accidents or vandalism or deteriorated due to age. Nearly sixty miles of turnpike fencing is in need of replacement within the next several years to ensure the safety of neighborhoods located adjacent to the turnpike.

The Economic Lifeline of Massachusetts

The Massachusetts Turnpike Authority was established by the state legislature in 1952 with the public mandate to construct, maintain and operate an express toll highway from the New York state line to the City of Boston. As a totally independent public agency, the Authority's income is derived solely from tolls and other revenues generated by its users. These monies fully support the operation, maintenance, policing and improvement of the highway. The Authority receives no state or federal funds for any of its operations.

Designed to the most advanced safety standards of its day, the Massachusetts Turnpike opened 123 miles of toll highway to service in 1957. This initial section of the turnpike stretched from the New York state line in West Stockbridge to Route 128 in Weston and was built with a bond issue of \$239 million. In 1965, an 11-mile extension was completed, connecting from Weston to Kneeland Street in Boston with a bond issue of \$218 million. In addition to roadways, this complex facility includes 260 bridges, 25 interchanges, 20 toll plazas, 3 police stations, 11 service areas and 6 maintenance facilities. The Massachusetts Turnpike is the major east-west artery in the Commonwealth and, as such, is an important part of the regional transportation system and plays a vital role in the state's economy.

The turnpike incorporated design standards for highway safety that were innovative in the 1950's and have stood the test of time. Over the years, the Authority has consistently maintained high standards incorporating the latest advances in highway safety and efficiency.

The turnpike is totally self-sufficient, deriving its income from tolls, real estate and investments. Toll revenues make up the largest portion of the highway's income (90%) with the remainder derived from lease income (restaurants, services stations, air rights and communication lines) and investments.

Since its establishment, the Massachusetts Turnpike Authority has operated within a balanced budget and continues to do so today. The Authority maintains an excellent bond rating on the public market. The importance of a good bond rating for any major public entity determines their capacity to undertake new construction under the most efficient schedule. Also because of its good bond rating, the Authority can borrow money when necessary at a lower rate of interest and thereby accomplish more construction.

Each year Turnpike Authority revenues go toward the retirement of outstanding bond obligations and toward operations,

maintenance and major construction projects. Money for major construction is placed in a Replacement Reserve Fund, which is earmarked for the essential repair work vital to a safe highway. Since 1980, the Turnpike Authority has invested \$207 million in the Replacement Reserve Fund which supports a wide range of projects including roadway resurfacing and bridge deck replacement. The annual rate of investment has grown steadily since 1980 (\$8 million) to its current annual level of \$33 million. This increase reflects not only the significant increase in construction costs but also the escalation in costs due to the aging of turnpike facilities. In addition to annual repairs, Replacement Reserve funds also are used to evaluate traffic management techniques which allow the turnpike to handle its growing traffic volume without expanding in sensitive areas.

A Public Mandate

The Massachusetts Turnpike Authority faces challenges of vital public concern. Without question, it must maintain and operate a safe highway, assuring that critical construction projects are undertaken and completed as necessary. Also, the turnpike is a major economic lifeline and must continue to meet the demands of increased traffic with the latest initiatives in traffic management.

The Authority also must operate as a responsible neighbor. The turnpike travels through 31 cities and towns from the western state line to the City of Boston and the Turnpike Authority must endeavor to address community concerns openly and to seek innovative resolutions wherever possible.

Finally, the Authority must protect the turnpike user's investment in their highway system and the private investments of its bond holders through prudent management of its resources. The Massachusetts Turnpike represents an enormous public investment that must be insured through continued maintenance and improvements.

Critical Needs for the 1990's

The turnpike currently funds its replacement reserve and capital projects from two sources. The Replacement Reserve Program funds reconstruction and repair projects while the Capital Improvements Program funds necessary additions to existing facilities. The following projects from both categories have been identified by the Turnpike Authority as essential to public safety and highway efficiency. Together, these projects represent \$603 million in projected construction costs over the next decade. These projects must be undertaken within the next ten years and this schedule represents more than twice current levels of construction spending.

The following projects do not represent a comprehensive assessment of the Turnpike Authority's capital needs. Rather, this list is an identification of critical needs. While many other projects could be included, the projects on this list represent only those projects with a compelling public safety need and those projects which are critical to the upgrading of the Authority's aging facilities.

Ten-Year Critical Needs

Replacement Reserve Projects

<i>Project</i>	<i>Construction Cost</i>	<i>Goals</i>
Roadways		
Repair/replace pavement	\$66,800,000	Average 10 turnpike miles per year
Upgrade highway guard	24,000,000	Replace highway guard more than 30 years old
Upgrade highway signs	2,000,000	Replace 20 year old signs in priority areas
Repair slopes	1,600,000	Repair eroded slopes in priority areas
Replace/upgrade right-of-way fencing	3,700,000	Replace fencing in residential areas
Clear drainage system	1,000,000	Clear drains which cause highway flooding during storm conditions
Replace metal bin walls	3,000,000	Replace deteriorated/rusted bin walls which support turnpike
Rehabilitate Prudential passageway	3,500,000	Repave riding surface and repair pavement slab
Stabilize and bench rock cuts	7,515,000	Increase safety zone for falling rocks in priority areas
Total Roadway Projects	\$113,115,000	
Bridges		
Replace bridge decks	\$167,500,000	Average 10 bridge deck replacements per year
Repair bridge decks	33,700,000	Average 4 bridge deck repairs per year
Clean and paint bridges	20,000,000	Repaint bridges which have not been painted in 10 years to protect from rusting
Total Bridge Projects	\$221,200,000	
Interchanges and Toll Plazas		
Replace interchange lighting	\$500,000	Replace transformers/switch gear where required
Upgrade utility buildings	1,500,000	Repair/replace roofs, doors and windows for energy efficiency
Rehabilitate toll plazas	4,000,000	Repair approaches and islands; add tandem booths and canopies for greater efficiency
Total Interchange and Toll Plaza Projects	\$6,000,000	

Service, Maintenance and Police Areas

Rehabilitate service areas	\$3,150,000	Repave service areas and replace the roofs on service stations where necessary
Rehabilitate/expand maintenance areas	6,500,000	Repave maintenance areas, provide additional maintenance garage areas and covered storage areas
Rehabilitate/expand police barracks	3,000,000	Repave police areas, replace roofs and repair doors/windows

Total Service, Maintenance and Police Area Projects

\$12,650,000

Fan Rooms and Pump Stations

Upgrade fan rooms	\$400,000	Rehabilitate 4 existing fans; provide new access doors
Upgrade pump stations	600,000	Replace motors at 5 pump stations

Total Fan Room and Pump Station Projects

\$1,000,000

Systemwide Projects

Replace HVAC systems	\$550,000	Replace 45 boilers
Inventory/remove asbestos	1,000,000	Inventory all buildings and remove asbestos
Hazardous materials identification and removal program	100,000	Inventory, identify and remove hazardous materials

Total Systemwide Projects

\$1,650,000

Total construction cost \$355,615,000

Engineering and construction contingencies \$106,685,000 Includes engineering, design, surveying, testing and construction contingencies

Total Replacement Reserve Projects

\$462,300,000

Capital Improvement Program

Roadways

Noise barrier program	\$5,000,000	Pilot program to determine effectiveness and establish future programs
Route 146 interchange	20,000,000	Provide turnpike connection for City of Worcester/Blackstone Valley
Additional emergency breakdown lanes	5,000,000	Provide additional breakdown lanes for improved safety on Boston extension
Truck climb lane with shoulder	4,100,000	Provide truck climb lane in 2 areas with steep grades (excess of 3.5%)
Maintain clear zone	600,000	Flatten slopes in selected areas to eliminate highway guard
Total Roadway Projects		\$34,700,000

Interchanges and Toll Plazas

Toll plaza improvements	\$27,500,000	Provide for additional toll collection and lane capacity
Upgrade utility building and expand employee parking	3,000,000	Expand to minimize overcrowding
Improve tandem trailer lots	3,000,000	Provide additional capacity at tandem trailer lots
Install traffic signal and signal timing modifications at turnpike approaches	400,000	To improve traffic flow at local streets and at grade intersections

Total Interchange and Toll Plaza Projects	\$33,900,000
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Service Areas

Upgrade service areas	\$7,500,000	Provide additional amenities including building improvements, tourist information, signage and facilities and parking for trucks
Total Service Area Projects		\$7,500,000

Systemwide Projects

Traffic management systems	\$15,000,000	Install variable message signs, HOV lanes, park and ride lots and automatic vehicle identification at toll plazas
Additional building space	2,000,000	Expand existing buildings to minimize overcrowding and provide handicapped access
SCAN system	500,000	Provide additional monitoring to fill gaps in system
Communication system	2,000,000	Replace outdated equipment for maintenance and police operations
Computer improvements	1,500,000	Purchase additional equipment to improve efficiency of operations

Total Systemwide Projects	\$21,000,000
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Total construction cost	97,100,000
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Project development and planning	15,000,000	Feasibility and environmental studies
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Total engineering and contingencies	29,130,000
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Total Improvement Program	\$141,230,000
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Total Replacement Reserve Projects	\$462,300,000
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Total Capital Improvement Projects	141,230,000
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Grand Total of Ten-Year Critical Needs	\$603,530,000
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A Safe Highway and A Good Neighbor

Maintaining the Turnpike

The maintenance of a safe highway is both a mandate to the Massachusetts Turnpike Authority and an important public trust. The Authority's aggressive maintenance policy ensures a safe highway for the motoring public. Maintenance operations are routinely performed by Authority staff with equipment that is owned or leased by the Massachusetts Turnpike Authority. This policy has garnered additional savings and an efficiency that only long time employees can provide. Routine maintenance includes repairing road surfaces, bridges and buildings, replacing damaged highway guard and lighting, snow plowing, grass mowing and keeping the roadway and adjacent properties clean and in good physical appearance.

Major construction projects undertaken with Replacement Reserve Funds are issued for public bid and undertaken by the lowest eligible and responsible bidder. Construction is performed by a general contractor and overseen by Authority staff.

The Authority installed a new computerized toll collection system with computers at each toll plaza. This system greatly improves the efficiency of toll collection operations by helping to move vehicles through toll plazas more quickly and by providing a lane-by-lane record of all transactions. In addition, the Authority continues to make every effort to install innovative traffic management systems at its busiest toll plazas. For example, in 1989 the Authority will add nine new tandem toll booths to ease congestion at four interchanges.

In 1986, the Authority installed a state-of-the-art roadway and weather monitoring system called SCAN (System Condition ANalysis). While long used for airport runways, the Authority was one of the first to use its application to highways. Remote units with pavement sensors are built into four bridge decks and adjacent roadway pavement along the turnpike. These sensors transmit pavement temperature, dew point, precipitation, wind speed and direction and the percent of chemical solutions on the road surface directly to the Weston Maintenance Area. Maintenance crews are alerted to weather and roadway conditions, enabling them to dispatch equipment quickly and efficiently.

Capital improvements undertaken during the last five years total more than \$86 million—all of which has been derived directly through turnpike revenues. This record of capital projects fi-

nanced, undertaken and completed by the staff of the Massachusetts Turnpike Authority is an outstanding accomplishment.

An Impressive Record of Highway Safety

The turnpike is a major part of the regional transportation system and has consistently been an extremely safe part of that system. A strong program of law enforcement by the Massachusetts State Police Troop E (permanently assigned to and supported by the Massachusetts Turnpike Authority) resulted in a decrease of the fatality rate by 5.3% in 1988. The turnpike is one of the safest highways in Massachusetts and, compared to toll highways across the nation, the turnpike's accident rate for 1988 was the lowest of the seven most heavily travelled toll highways. In addition, a State Police truck enforcement team is assigned to enforce trucking laws exclusively. These specific laws include weight statutes and other trucking regulations as well as speeding and other highway laws. The dedicated team protects motorists from the hazards presented by overloaded trucks and also protects highway facilities from the damaged caused by overweight vehicles.

During winter months, the Authority maintains a "bare pavement" policy for the removal of snow and ice, meaning that roadway and bridge surfaces are kept entirely clear. Authority staff employ a combination of deicing compounds (primarily sodium chloride) and snow plowing. Critical information on roadway and bridge conditions during bad weather is provided to maintenance crews continuously by the SCAN roadway and weather monitoring computer system. A dedicated staff using a state-of-the-art computer system enables the turnpike to remain open and safe throughout the most severe winter weather conditions.

The Authority takes an active role in addressing the concerns of communities along the turnpike. In 1973, the Authority became one of the first agencies in Massachusetts to provide storage sheds for all of their salt storage areas to protect groundwater resources. The Authority continues to study and implement groundwater protection measures. In addition, all snow plowing and salting equipment is calibrated by turnpike maintenance staff to insure that the minimum amount of salt is used to attain bare pavement. The Turnpike Authority continues to strive to find new and environmentally sensitive methods of ice control.

A Responsible Neighbor

The Authority maintains open communications with the cities and towns along the length of the highway and solicits local opinion on matters affecting these communities. Recently, the Authority abandoned plans to widen a portion of the turnpike. The Authority listened carefully to the concerns of abutting communities and opted to implement a traffic management program that did not require roadway expansion. More recently, Board meetings and community meetings have been held in Lee and Chicopee and similar meetings are planned for other communities during 1989-90.

During the *Critical Needs Study*, the Authority committed to begin to develop a program to address the impact of noise on abutting neighborhoods and communities. This report recommends funds to support the Authority's first pilot program in this area. In addition, the Authority will soon issue a separate report describing the steps it will begin to take to implement this new initiative.

In response to a request from the City of Boston and neighborhoods surrounding the turnpike, the Authority is currently studying the engineering feasibility of transportation improvements along the eastern most portion of the Boston extension including the feasibility of establishing a new point of access and egress. Any decision by the Authority to move forward with any of these transportation improvements will require the preparation of an environmental impact report as well as an analysis of financial feasibility. Funds necessary to undertake the actual construction of these improvements would require that additional funds be approved over and above the funds identified in this *Critical Needs Report*.

The Authority recently assumed operation of four tourist information centers located along the turnpike from the state's Division of Travel and Tourism in an effort to assist with statewide economic concerns. These centers provide information and assistance to motorists including maps, brochures and direct phone lines to hotels. A questionnaire is in the planning stages that will solicit opinions from motorists on highway needs and other issues.

As part of a statewide beautification initiative, the Authority undertook a landscaping program to enhance the highway's visual appeal for motorists, to incorporate the interests of local communities and to protect the aesthetic qualities of adjacent scenic and historical resources. Landscape design along the turnpike incorpo-

rates environmental and aesthetic issues while preserving the value of the natural landscape. Wildflowers, natural grasses, flowering trees and evergreen shrubbery have been added to the slopes of the highway as part of this program. The Authority also had added plantings to toll plazas and service areas to keep these areas attractive. The turnpike serves as the gateway to Massachusetts for many out-of-state visitors. As such, it is important to present a beautiful and inviting highway to all visitors to the state.

The Nation's Highways

The turnpike is part of the national system of roadways which has received substantial media coverage in the last several years. Serious and often tragic bridge and highway failures capture the public attention. But the real and silent issue for many highways is one of increasing age and continuing neglect because of budgetary constraints.

The American Transportation Advisory Council (ATAC) stated in a recent report, "Today the United States has the most extensive and efficient network of highways ... found anywhere in the world. ... Unfortunately, the network also shows the effects of the relentless enemies of construction: age, heavy usage and the elements. As we approach the 21st century, many transportation facilities in the U.S. are in critical need of repair. With a growing and constantly mobile American population, in many parts of the nation our transportation network is reaching its maximum capacity and must be expanded".

The report continues, "The Federal Highway Administration projects that by the year 2000 approximately 41,000 miles of interstate highway, 334,000 miles of arterial roads and 636,000 miles of collector roads will require capital improvements just to maintain current serviceability. ... There are more than 574,000 bridges in the U.S. In 1984, the Federal Highway Administration estimated more than 260,000 of them were deficient in some way."

Within this national atmosphere of deteriorating roadways and bridges, the Authority's program of maintenance has kept the turnpike in good repair. But it is apparent that the maintenance program alone cannot work quickly enough to compensate for the increasing age of turnpike facilities. Major issues of public safety present a compelling need.

The Need Is Clear

Since 1979, the Turnpike Authority has undertaken more than \$250 million of highway construction projects. To meet the challenges of the next decade and beyond, the Turnpike Authority must double that effort with more than \$600 million required to accomplish construction and maintenance projects that directly impact public safety and highway efficiency. Necessary repair and con-

struction projects are located along the length of the highway. Approximately 35% of these needed projects are located from Boston to Route 495 and 65% are located west of Route 495 to the Berkshires.

Planning for the Future

Excellent management practices have kept the Authority's budget in balance and an outstanding program of maintenance has kept the highway in good repair. But the race to maintain a safe and efficient highway is losing ground to the growing needs of an aging highway. At the current rate of construction, the Turnpike Authority cannot hope to keep up with current construction demands. It is necessary to more than double that rate of construction over the next ten years if the Massachusetts Turnpike is to meet the needs of the residents of Massachusetts in the next century as well as the needs of the Commonwealth's future economy.

**Prepared by the
Massachusetts Turnpike Authority**

Fall 1989